



Leiter International Performance Scale – Revised



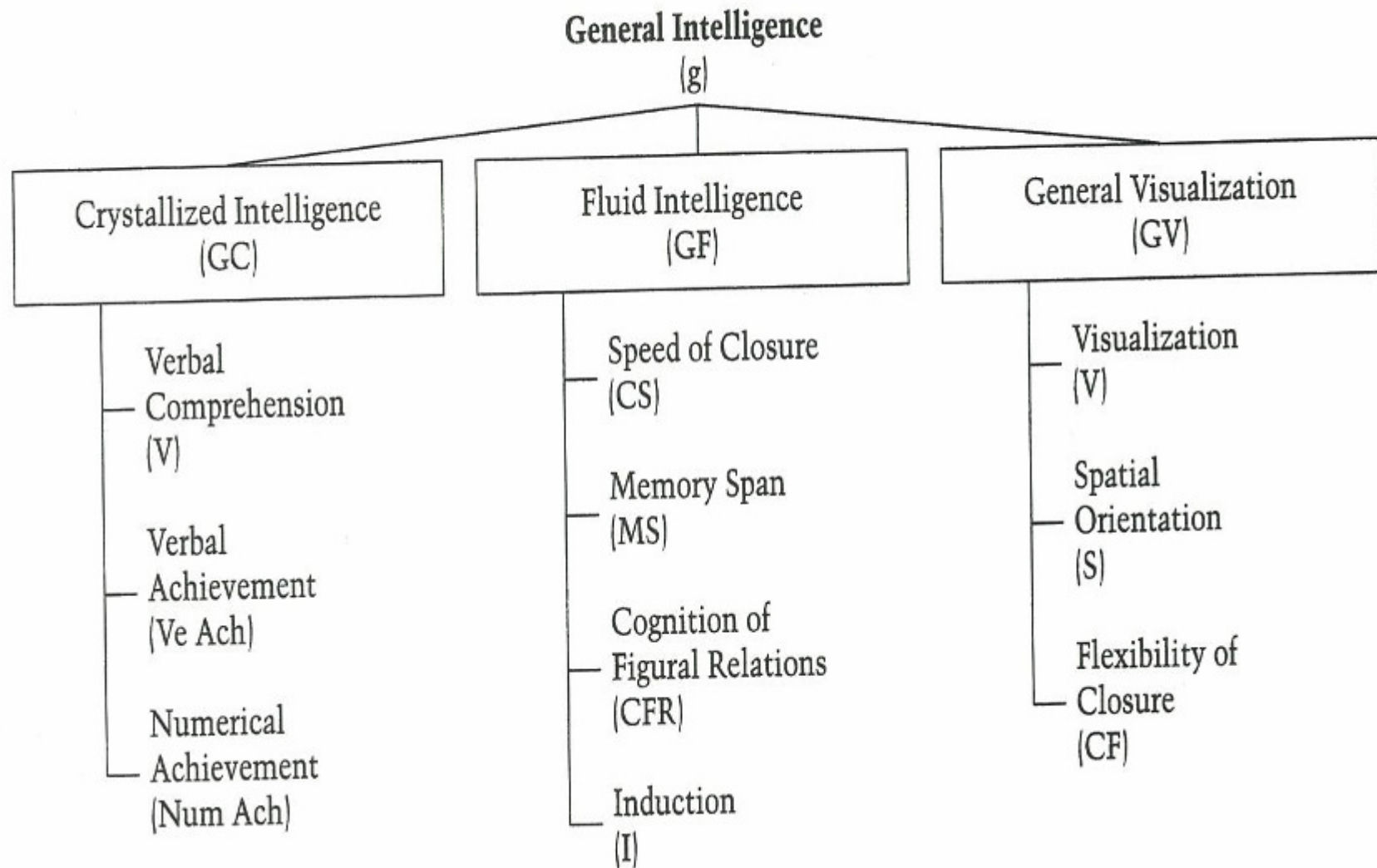
Gale H. Roid
Lucy J. Miller

Presented by,
Eirini Lammi – Registered Psychologist

Australian Council for Educational Research

Unifying Model of Nonverbal Intelligence

Gustafsson's Hierarchical Model of Cognitive Abilities



Definition of General Intellectual Ability

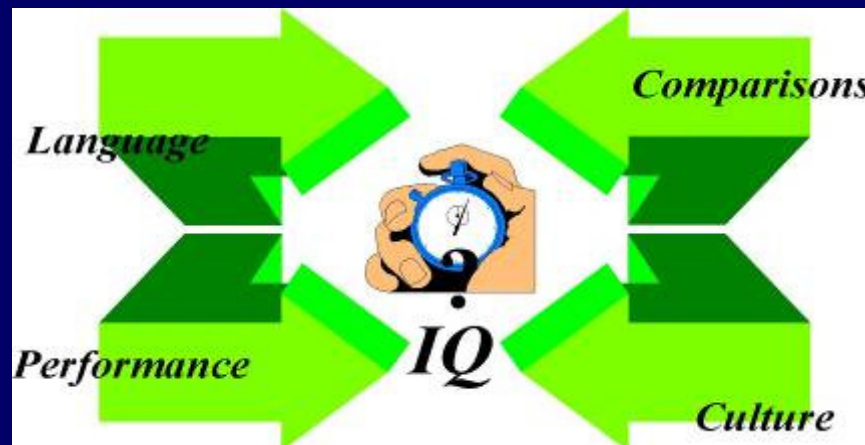
“Intelligence is a multifaceted array of cognitive abilities with a general (g) overarching ability, composed of at least 8 major dimensions.”

(Leiter-R; Roid & Miller, 1997)

“The general ability to perform complex nonverbal mental manipulations related to conceptualization, inductive reasoning, and visualisation” (Leiter-R; Roid & Miller, 1997, p. 103)

The Assumption of Comparability

“When we test students using a standardized device and compare them to a set of norms to gain an index of their relative standing, we assume that the students we test are similar to those on whom the test was standardized.”



Acculturation and Language Differences

“The difficulty with norms in the case of culturally and linguistically diverse children rests with the issue of what constitutes ‘representative’. All too often, race and ethnicity are equated with culture. Culture is neither, thus measured performance is more likely to reflect varying levels of individual acculturation more so than variation in actual or ‘true’ cognitive ability.”

Flanagan & Ortiz, 2001



Definitions of Nonverbal

What is a nonverbal test?

A test that reduces language loading in directions, items, or responses.

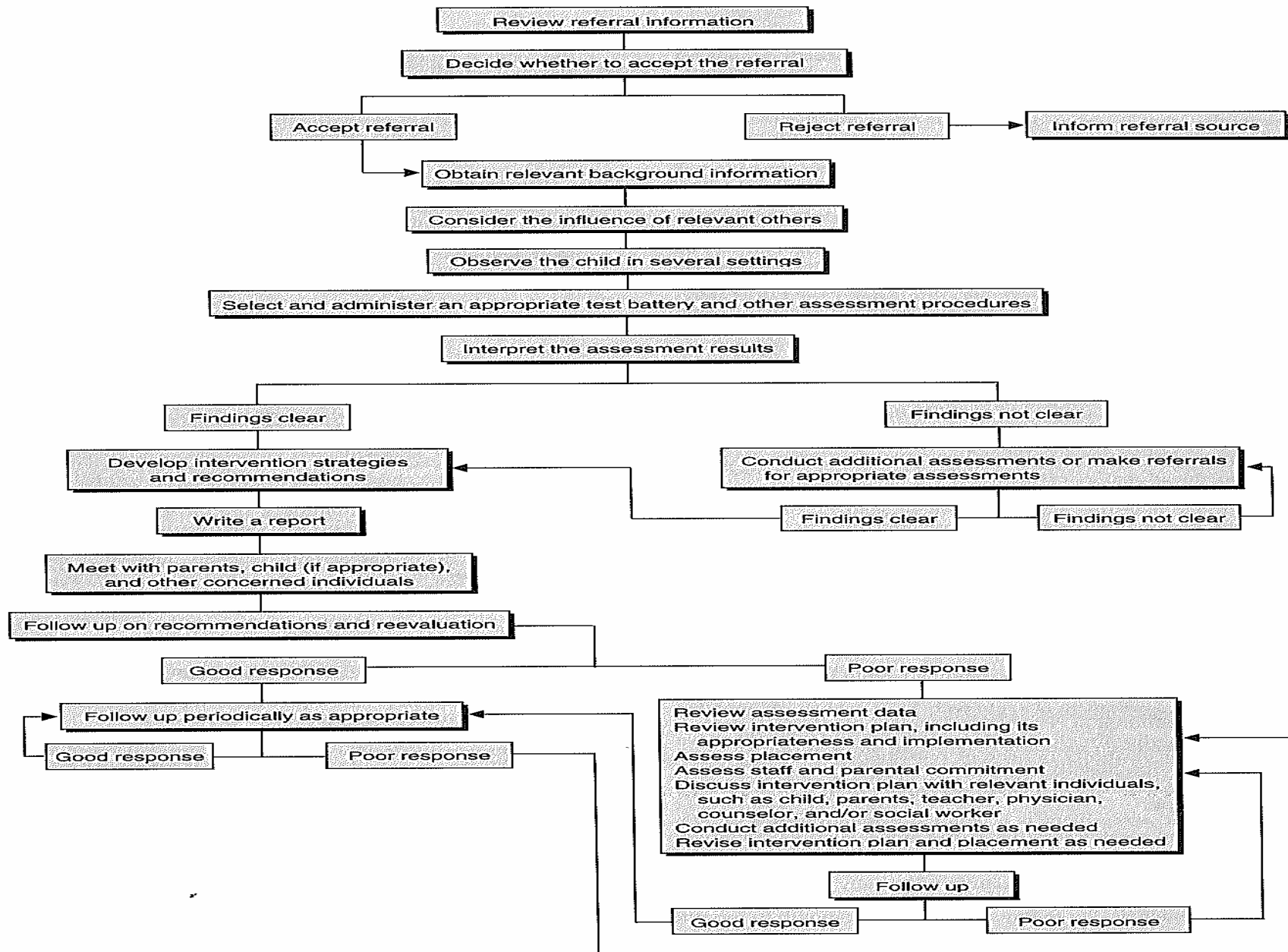
When should examiners use nonverbal tests of intelligence?

Conditions associated with language differences, hearing impairment and disabilities indicate use of nonverbal tests.

Recognizing the Limitations of Nonverbal Assessment

- Tend to measure a narrow range of intellectual abilities (eg, visual processing)
- May result in constructs that are restricted and fail to capture the full range of intellectual functioning
- Often don't have adequate norm sample representation.

Referral Flow Chart





Generating a Hypothesis

- Collecting relevant information and data
- Knowledge of a child's language proficiency
- Distinguishing language differences from disorders
- Assess and evaluate opportunity for learning
- Assess and evaluate relevant cultural and linguistic factors
- Evaluate, revise and re-test hypotheses
- Determine test protocol

Choosing appropriate battery of tests

- What is the purpose of the testing?
- When was it published?
- What was the standardization group?
- How reliable is the assessment measure?
- Are data presented about the performance of diverse groups on the test?
- What validity measures are provided?



Introduction of the Leiter-R

- Mainly used for individuals with poor verbal communication skills, hearing impairment, traumatic brain injury, English as a second language.

Standardization and Psychometric Properties

- Normative sample stratified on basis of gender, race, socioeconomic status, etc.
- VR battery normed on 1710 children, adolescents, adults
- AM battery normed on 763 children, adolescents, adults – due to its smaller size, it has proportionately larger deviations from the US population

Technical Properties

Average Internal Consistency Reliability Coefficients for Composites by Age

Leiter-R Composite	Ages 2 to 5	Ages 6 to 10	Ages 11 to 20
Brief IQ Screener	.88	.90	.89
Full Scale IQ	.92	.91	.93
Fundamental Visualization	.92	—	—
Fluid Reasoning	.88	.89	.89
Spatial Visualization	—	—	.91
Memory Screener	.87	.76	.75
Recognition Memory	.93	.87	—
Associative Memory	—	.81	.79
Memory Span	—	.88	.89
Attention	—	.79	.83
Memory Process	—	.86	.88

Note. From Roid and Miller, 1997.

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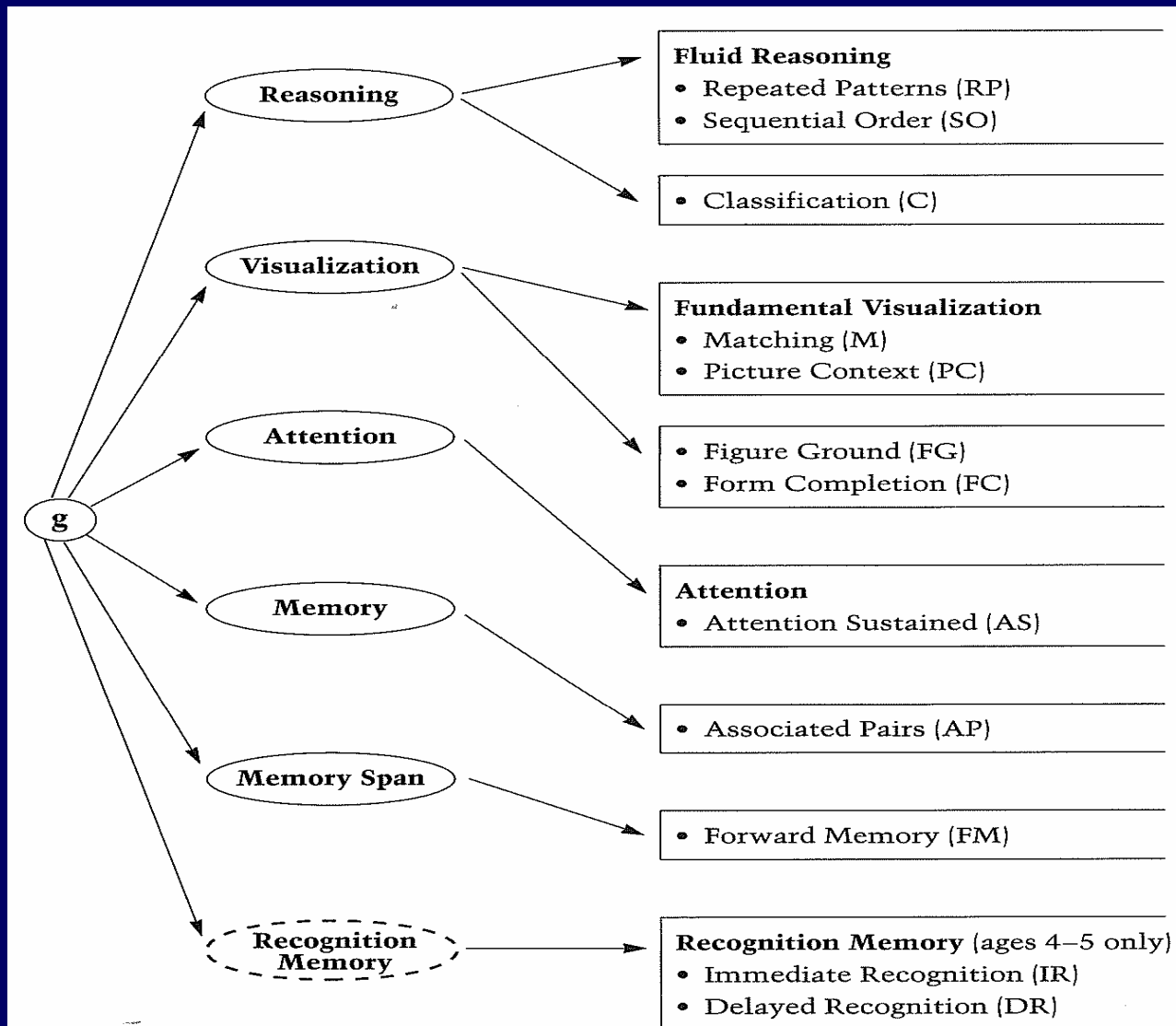
Validity Studies

- Almost all of the subtests are Fair or Poor measures of *g*.
- Moderate to strong correlations between Leiter-R Brief IQ and FSIQ (but no means and SDs were reported).
- Mean FSIQs for various 6-20 year old samples are lower than anticipated.
- McGrew and Flanagan (1998) classified 8 of the 20 subtests as containing high levels of cultural content

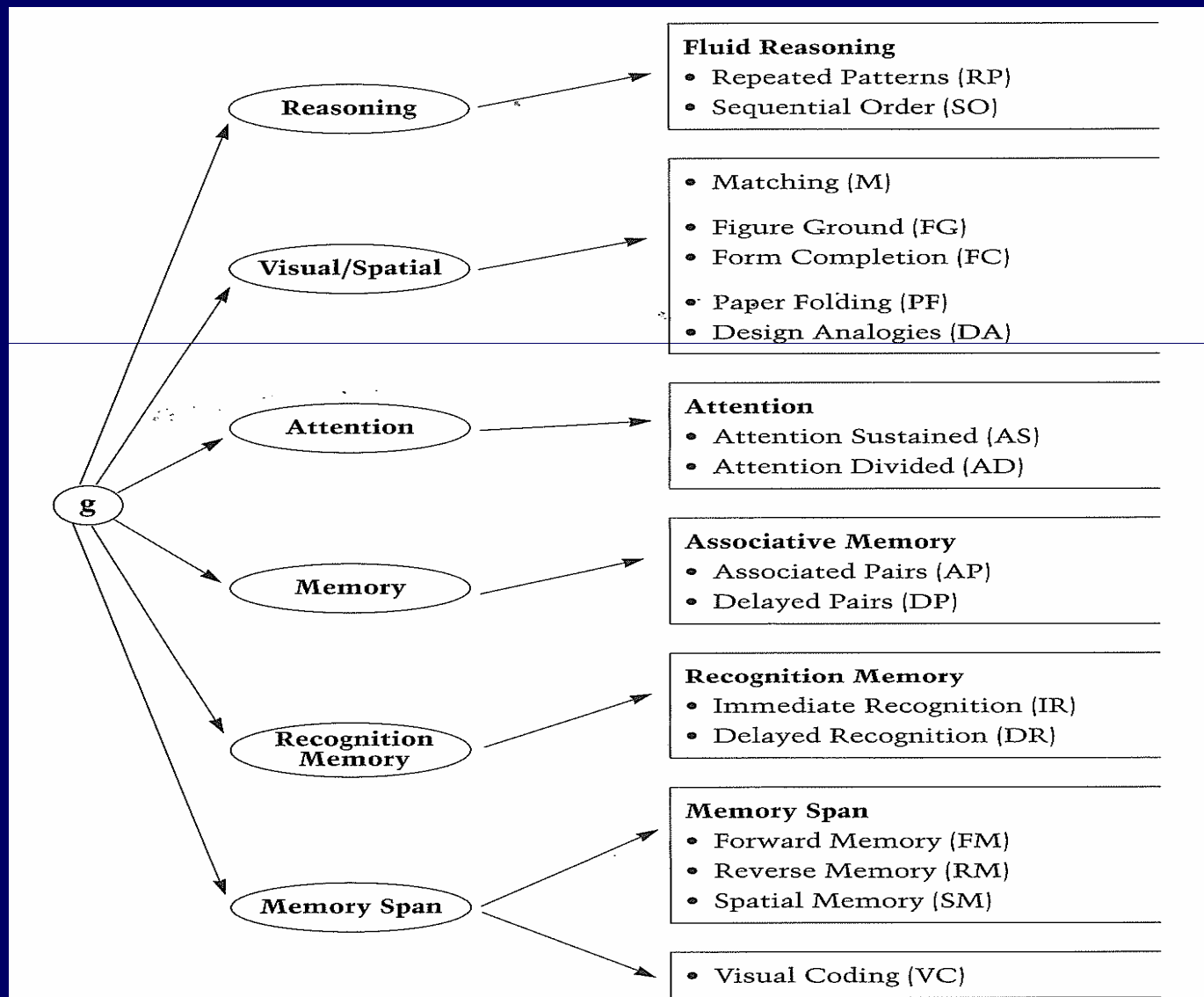
Organisation of the Leiter-R

Full Scale IQ, Brief IQ, Composites, and Subtest Scores available from the Leiter-R		
Subtests for Brief IQ, Full Scale IQ, and Composites		
Brief IQ	Full Scale IQ (Ages 2 to 5)	Full Scale IQ (Ages 6 to 20)
Figure Ground (FG)	Figure Ground (FG)	Figure Ground (FG)
Form Completion (FG)	Form Completion (FG)	Form Completion (FG)
Repeated Patterns (RP)	Repeated Patterns (RP)	Repeated Patterns (RP)
Sequential Order (SO)	Sequential Order (SO)	Sequential Order (SO)
	Matching (M)	Design Analogies (DA)
	Classification (C)	Paper Folding (PF)
Fluid Reasoning	Fundamental Visualization	Spatial Visualization
Sequential Order (SO)	Matching (M)	Design Analogies (DA)
Repeated Patterns (RP)	Picture Context (PC)	Paper Folding (PF)
		Figure Rotation (FR)
Memory Screening	Associative Memory	Memory Span
Associated Pairs (AP)	Associated Pairs (AP)	Forward Memory (FM)
Forward Memory (FM)	Delayed Pairs (DP)	Reverse Memory (RM)
		Spatial Memory (SM)
Attention	Memory Process	Recognition Memory
Attention Sustained (AS)	Forward Memory (FM)	Immediate Recognition (IR)
Attention Divided (AD)	Spatial Memory (SM)	Delayed Recognition (DR)
	Visual Coding (VC)	

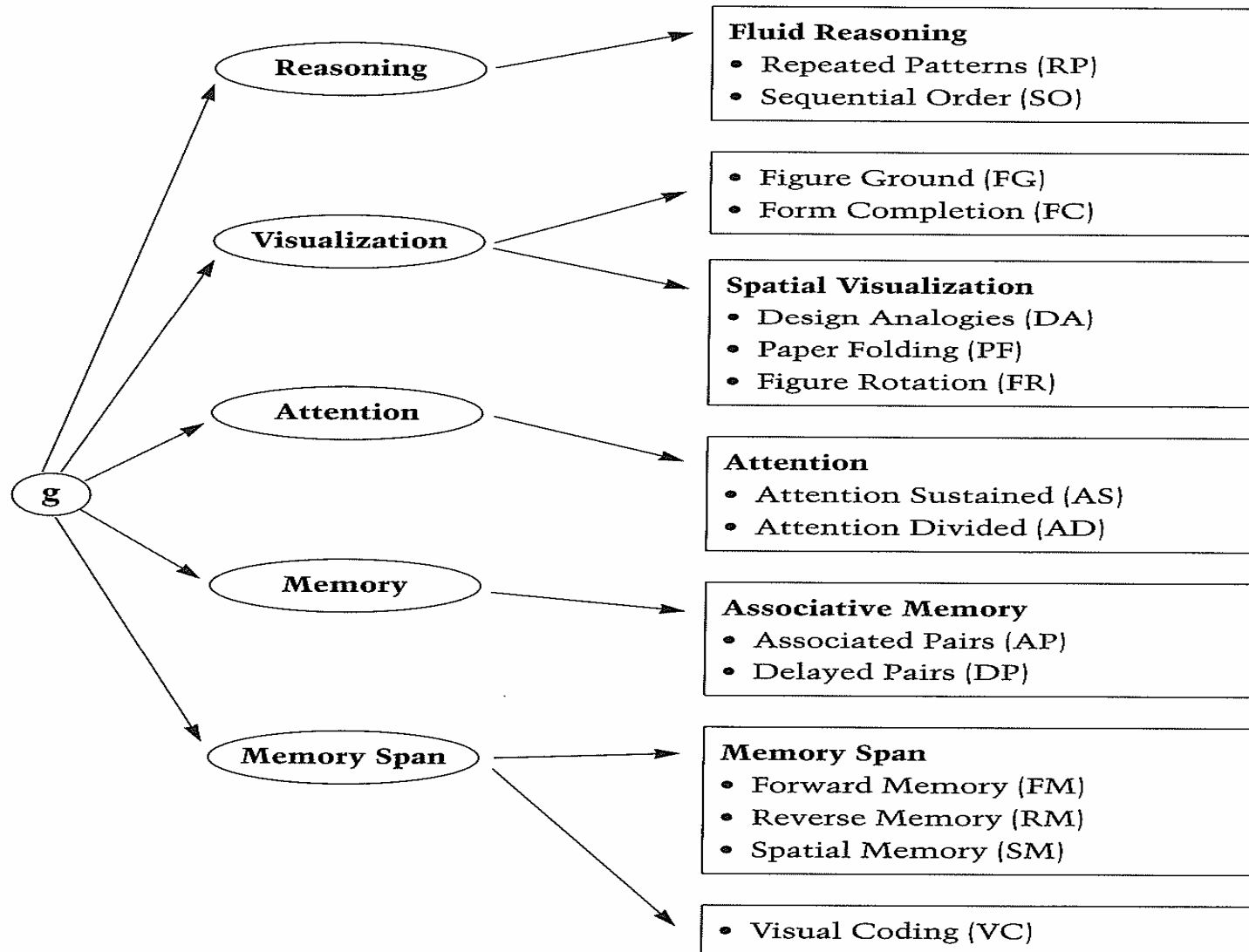
Hierarchical Model of the Leiter-R 2-5 years



Hierarchical Model of the Leiter-R 6-10 years



Hierarchical Model of the Leiter-R 11-20 years





Full Scale IQ Scores

- Brief IQ: obtained from Brief IQ Screener consisting of 4 subtests.
- Full Scale IQ: obtained from administering 6 subtests.
- Mean = 100, SD = 15

General Ability IQ Scores

Subtest Composition of Brief IQ Screener and Full IQ Scores by Age Groups

IQ Scale	Subtests Contributing to Scaled Score	Age Group to which Subtest is Administered
Full Scale IQ (Ages 2-5)	Matching (M)	2-5
	Classification (C)	2-5
	Figure Ground (FG)	2-20
	Form Completion (FC)	2-20
	Repeated Patterns (RP)	2-20
	Sequential Order (SO)	2-20
Full Scale IQ (Ages 6-20)	Figure Ground (FG)	2-20
	Form Completion (FC)	2-20
	Repeated Patterns (RP)	2-20
	Sequential Order (SO)	2-20
	Design Analogies (DA)	6-20
	Paper Folding (PF)	6-20
Brief IQ Screener (All Ages)	Figure Ground (FG)	2-20
	Form Completion (FC)	2-20
	Repeated Patterns (RP)	2-20
	Sequential Order (SO)	2-20

Composite Scores

- VR Battery produces 5 composite scores:
- Mean = 100, SD = 15
- Brief IQ and FSIQ

Subtest Composition of the VR Composite Scores

Composite	Subtests Contributing to Composite Score	Age Group to which Subtest is Administered
Fluid Reasoning	Sequential Order (SO) Repeated Patterns (RP)	2-20
Fundamental Visualization	Matching (M) Picture Context (PC)	2-5
Spatial Visualization	Design Analogies (DA) Paper Folding (PF) Figure Rotation (FR)	11-20

Record Forms

Visualization and Reasoning



Leiter-R
Leiter International Performance Scale-Revised

Record Form Visualization and Reasoning Battery

Visualization and Reasoning Subtests	All Ages		Ages 2-5		Ages 11-20		Ages 6-20	
	Raw Scores	Scaled Scores	Fluid Reas.	Brief IQ	Fund. Visual.	Full IQ	Spatial Visual.	Full IQ
Figure Ground (FG)	20	9	9		9			9
Design Analogies (DA)	8	7					7	7
Form Completion (FC)	31	10	10		10			10
Matching (M)	35	13		13	13			
Sequential Order (SO)	33	10	10	10				10
Repeated Patterns (RP)	23	12	12		12			12
Picture Context (PC)	—	—						
Classification (C)	—	—						
Paper Folding (PF)	8	11					11	11
Figure Rotation (FR)	—	—						
Sum of Scaled Scores			34	41				59
			Fluid Reas.	Brief IQ	Fund. Visual.	Full IQ	Spatial Visual.	Full IQ
			All Ages		Ages 2-5		Ages 11-20	
			Ages 6-20		Ages 11-20		Ages 6-20	
To calculate IQ/Composite scores, go to Appendix D, Table D-1								
*Enter RP Scaled Score twice in this area								

Section B

Section C

Age	Reasoning		Visualization					Spatial			Age
	SO	RP	FG	FC	M	PC	C	DA	PF	FR	
19	10	12	9	10	13	—	—	7	11	—	19
18	18
17	17
16	16
15	15
14	14
13	13
12	12
11	11
9	9
8	8
7	7
6	6
5	5
4	4
3	3
2	2
1	1

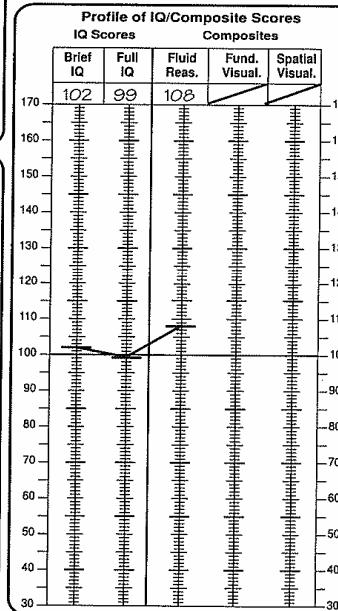
Name Julia Smith Sex F
 School Central Grade 3
 Color Blindness ☐ Y ☒ N Other vision problem ☐ Y ☒ N
 Examiner G. Mills

Section A

	Year	Month	Day
Date Tested	95	8	14
Date of Birth	86	5	2
Age	9	3	12

	Sum of Scaled Scores	IQ/Composite Score	%ile	90% Confidence Interval
Fluid Reas.	34	108	70	99 - 117
Brief IQ	41	102	55	94 - 110
Fund. Visual.	—	—	—	—
Spatial Visual.	—	—	—	—
Full IQ	59	99	47	91 - 107

Section D



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Section E

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Composite Scores

- Attention and Memory Battery composite scores:
- Mean = 100, SD = 15

Subtest Composition of the AM Composite Scores

Composite	Subtests Contributing to Composite Score	Age Group to which Subtest is Administered
Memory Screening	Associated Pairs (AP) Forward Memory (FM)	2-20
Associative Memory	Associated Pairs (AP) Delayed Pairs (DP)	6-20
Memory Span	Forward Memory (FM) Reverse Memory (RM) Spatial Memory (SM)	6-20
Attention	Attention Sustained (AS) Attention Divided (AD)	6-20
Memory Process	Forward Memory (FM) Spatial Memory (SM) Visual Coding (VC)	6-20
Recognition Memory	Immediate Recognition (IR) Delayed Recognition (DR)	4-10

Record Forms

Attention and Memory Battery



Leiter-R
Leiter International Performance Scale-Revised

Record Form Attention & Memory Battery

Name Julia Smith Sex F

School Central Grade 3

Color Blindness ☐ Y ☒ N Other vision problem ☐ Y ☒ N

Examiner G. Mills

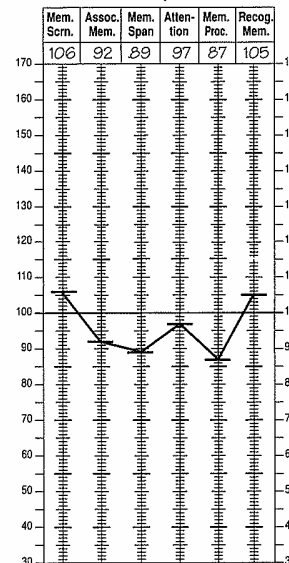
	Year	Month	Day
Date Tested	95	8	14
Date of Birth	86	5	2
Age	9	3	12

Attention & Memory				All Ages	Ages 6-20				Ages 4-10
Subtests	Raw Scores	Scaled Scores	Memory Screen	Assoc. Memory	Memory Span	Attention	Mem. Proc.	Recog. Memory	
Associated Pairs (AP)	27	11	11	11					
Immediate Recog. (IR)	20	11							11
Forward Memory (FM)	20	11	11		11		11		
Attention Sustained (AS)	94	10			10				
Reverse Memory (RM)	9	9			9				
Visual Coding (VC)	30	9					9		
Spatial Memory (SM)	4	5			5				
Delayed Pairs (DP)	12	6		6					
Delayed Recog. (DR)	20	11							11
Attention Divided (AD)	21	9				9			
Sum of Scaled Scores				22	17	25	19	25	22
				Mem. Screen	Assoc. Mem.	Mem. Span	Attention	Mem. Proc.	Recog. Mem.
				All Ages	Ages 6-20				Ages 4-10
					E1.1	E1.2	E1.3	E1.4	E1.5
									E1.6

Profile of Subtest Scores									
Memory									
	AP	DP	IR	DR	FM	RM	SM	VC	Attention
	11	6	11	11	11	9	5	9	10
19
18
17
16
15
14
13
12
11
9
8
7
6
5
4
3
2
1

	Sum of Scaled Scores	Composite Score	%ile	90% Confidence Interval
Memory Screen	22	106	66	93 - 119
Associative Mem.	17	92	30	81 - 103
Memory Span	25	89	23	80 - 98
Attention	19	97	42	85 - 109
Memory Process	25	87	19	77 - 97
Recognition Mem.	22	105	63	96 - 114

Profile of Composite Scores



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Subtest Scores

- 20 subtests
- First 10 subtests make up Visualization and Reasoning (VR) Battery
- Second 10 subtests make up Attention and Memory (AM) Battery
- Subtests Mean = 10, SD = 3

Subtests in the Leiter-R

- Visualization and Reasoning (VR) Battery

1. Figure Ground	6. Repeated Patterns
2. Design Analogies	7. Picture Context
3. Form Completion	8. Classification
4. Matching	9. Paper Folding
5. Sequential Order	10. Figure Rotation

- Attention and Memory (AM) Battery

11. Associated Pairs	16. Visual Coding
12. Immediate Recognition	17. Spatial Memory
13. Forward Memory	18. Delayed Pairs
14. Attention Sustained	19. Delayed Recognition
15. Reverse Memory	20. Attention Divided

Four Optional Social-Emotional Rating Scales

Subtests Included on the Four Leiter-R Rating Scales

Examiner Scale	Parent Scale	Self Rating Scale	Teacher Scale
Attention	Attention	Organization	Attention
Organization/Impulse Control	Activity Level	Activity Level and Moods	Organization/Impulsivity
Activity Level	Impulsivity	Feelings and Reactions	Activity Level
Sociability	Adaptation	Self Esteem	Social Abilities
Energy and Feelings	Mood and Confidence		Mood and Regulation
Mood and Regulation	Energy and Feelings		Temperament
Anxiety	Social Abilities		Reactivity
Sensory Reactivity	Sensitivity and Regulation		Adaptation

Examiner Rating Scale

Rarely/Never
Sometimes
Often
Usually/Always

- F. MOOD AND REGULATION**
- 0 1 2 3
Modulates thoughts; not inundated by unrelated ideas
- 0 1 2 3
No unrelated or bizarre responses
- 0 1 2 3
Realistic; not self-aggrandizing or overly pretentious
- 0 1 2 3
Stable disposition; no lability or mood swings
- 0 1 2 3
Regulated state; not over-aroused or over-reactive
- 0 1 2 3
Normal behaviors observed (e.g. no picking, twirling objects, twisting hair, fidgeting with jewelry in an excessive manner)

16

F. MOOD AND REGULATION RAW SCORE

Rarely/Never
Sometimes
Often
Usually/Always

- G. ANXIETY**
- 0 1 2 3
Assured; not apprehensive or worried during session
- 0 1 2 3
Composed; not overwhelmed or rattled
- 0 1 2 3
Regulated approach; not obsessive or compulsive about details
- 0 1 2 3
Calm; not agitated or jittery in session
- 0 1 2 3
Persists with difficult tasks; recognizes limits appropriately
- 0 1 2 3
Tolerant; not irritated or annoyed with test tasks

17

G. ANXIETY RAW SCORE

Rarely/Never
Sometimes
Often
Usually/Always

- H. SENSORY REACTIVITY**
- 0 1 2 3
Normal reactions to outside noises, not oversensitive to sounds
- 0 1 2 3
Concentrates; not distracted by visual stimuli
- 0 1 2 3
Adapts during transitions between tasks
- 0 1 2 3
Modulates and regulates arousal level in self

12

H. SENSORY REACTIVITY RAW SCORE

SEVERE BEHAVIORS

[Check box only if this applies to child]

- ☐ Stereotypical, perseverative, or autistic-like behaviors
- ☐ Bizarre communications or preoccupations
- ☐ Odd verbalizations or sounds
- ☐ Impaired non-verbal communication, i.e. no eye contact
- ☐ Thought processes are peculiar, illogical and tangential
- ☐ Delusions or hallucinations are communicated
- ☐ Paranoid; preoccupied with persecution

ADDITIONAL COMMENTS

Child's Name J. Smith (F) 9 yr. 3 mon.

Date of Evaluation 8/14/95

SECTIONS A-D SCORES		SEE APPENDIX C2
	Raw Score	Scaled Score
A. ATTENTION	26	7
B. ORGAN./IMP. CONTROL	22	7
C. ACTIVITY LEVEL	10	7
D. SOCIABILITY	15	10
Cognitive/Social	Composite Raw Score: 73	
See App. E2 →	Composite Standard Score: 85	

INSTRUCTIONS
Sum Sections A thru D Raw Scores to find Composite Raw Score. See App. E2 to convert Composite Raw Score to a Standard Score.

SECTIONS E-H SCORES		SEE APPENDIX C2
	Raw Score	Scaled Score
E. ENERGY & FEELINGS	16	7
F. MOOD & REGULATION	16	6
G. ANXIETY	17	9
H. SENSORY REACTIVITY	12	10
Emotions/Regulation	Composite Raw Score: 61	
See App. E2 →	Composite Standard Score: 86	

INSTRUCTIONS
Sum Sections E thru H Raw Scores to find Composite Raw Score. See App. E2 to convert Composite Raw Score to a Standard Score.

6 Steps in Interpretation

1. Interpret the Full Scale IQ and Composite Scores
2. Determine the statistical significance of Composite Score differences
3. Determine whether the differences between Composite Scores are abnormally large

6 Steps in Interpretation

4. Interpret the significant strengths and weaknesses of the Profile
5. Subtest interpretation
6. Generate hypotheses about fluctuation in the profile

Case Study

Psychological Evaluation

Name: John Smith

Age: 3 years, 10 months

Language: English, Spanish

Reason for Referral: John was referred by his parents because of speech and language difficulties, as well as assistance with educational planning.



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Australian Council for Educational Research